

CURRICULUM VITAE

March 25, 2018

1. PERSONAL INFORMATION

Radu Victor Balan

Full time, 50 % Department of Mathematics, 50 % Center for Scientific Computation and Mathematical Modeling

Webpage: <http://www.math.umd.edu/~rvbalan>

Educational background

B. E., September 1992, Electrical Engineering, Polytechnic Institute of Bucharest, Romania

B. A., May 1994, Physics, University of Bucharest, Romania

Ph. D., May 1998, Applied and Computational Mathematics, Princeton University, New Jersey

Employment background

2011 - Present, Professor, University of Maryland, College Park, MD

2007 - 2011, Associate Professor, University of Maryland, College Park, MD

1999 - 2007, (Senior) Research Scientist, Siemens Corporate Research, Princeton, NJ

1998 - 1999, Postdoctoral Associate, Institute of Mathematics and Its Applications, Minneapolis, MN, and IBM TJ Watson Research Center, Hawthorn, NY

Affiliations

2007 - present: Norbert Wiener Center for Applied Harmonic Analysis (NWC), University of Maryland

2007 - present: Applied Mathematics, Statistics, and Scientific Computation Program (AMSC), University of Maryland

2008 - present: Institute for Systems Research (ISR), University of Maryland

2012 - present: Info-Metrics Institute, American University

2. RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

a. Books

ii. Books edited

1. T. D. Andrews, R. Balan, J. J. Benedetto, W. Czaja, K. A. Okoudjou (Eds.) , Excursions in Harmonic Analysis, volume I, Birkhauser, 2013, <http://dx.doi.org/10.1007/978-0-8176-8376-4>
2. T. D. Andrews, R. Balan, J. J. Benedetto, W. Czaja, K. A. Okoudjou (Eds.) , Excursions in Harmonic Analysis, volume II, Birkhauser, 2013, <http://dx.doi.org/10.1007/978-0-8176-8379-5>
3. R. Balan, M.J. Begué, J.J. Benedetto, W. Czaja, K.A. Okoudjou (Eds.), Excursions in Harmonic Analysis, volume III, Birkhauser, 2015, <http://dx.doi.org/10.1007/978-3-319-13230-3>
4. R. Balan, M.J. Begué, J.J. Benedetto, W. Czaja, K.A. Okoudjou (Eds.), Excursions in Harmonic Analysis, volume IV, Birkhauser, 2015, <http://dx.doi.org/10.1007/978-3-319-20187-0>
5. R. Balan, J.J. Benedetto, W. Czaja, M. Dellatorre, K.A. Okoudjou (Eds.), Excursions in Harmonic Analysis, volume V, Birkhauser, 2017

iii. Chapters in Books

- [1] R. Balan, I. Daubechies, Optimal Stochastic Approximations and Encoding Schemes using Weyl-Heisenberg Sets, chapter in "Gabor Analysis: Theory and Applications", Eds. H.Feichtinger and T.Strohmer, Birkhäuser 2002.
- [2] R. Balan, M. Begue, C. Clark, K. Okoudjou, *Optimization methods for frame conditioning and application to graph Laplacian scaling*, available online arXiv:1609.02233 [math.FA], to appear in "Novel methods in harmonic analysis with applications to numerical analysis and data processing", Lecture Notes ANHA Series, I.Pesenson and all Eds., Birkhauser 2017.
- [3] A. Bohannon, B. Sadler, R. Balan, *A Filtering Framework for Time-Varying Graph Signals*, to appear in "Vertex-frequency analysis of graphs", L. Stankovic and E. Sejdic Eds., Springer 2019.

b. Articles in Refereed Journals

(*) indicates journals where the authors' order is by importance of contribution; in all other papers the authors are listed alphabetically as in customary in mathematics.

- [1] R. Balan, *A Note about Integrability of Distributions with Singularities*, Bollettino U.M.I. (7) 8-A (1994), 335-344
- [2] R. Balan, *Homogeneous Polynomial Approximations of Nonlinear Control Systems*, Revue Roumaine de Science Techniques, serie Electrotechnique et Energetique, (39) no.4, (1994), 503-511
- [3](*) R. Balan, D. Aur, *An On-Line Robust Stabilizer*, Journal in Guidance, Control and Dynamics, (18) no.3, (1995), 642-644
- [4] R. Balan, *Horseshoe and Analytic Nonintegrability of a Spinless Axiallysymmetric Rigid Body in Central Newtonian Field*, Celestial Mechanics and Dynamics Astronomy, vol.63 (1995), 59-79
- [5] R. Balan, *Stability Theorems for Fourier Frames and Wavelet Riesz Bases*, J.Fourier Anal. Applic., Vol.3, No.5, (1997), 499-504
- [6] R. Balan, *An Uncertainty Inequality for Wavelet Sets*, Appl. Comput. Harmon. Anal., Vol.5, No.1, (1998) 106-108
- [7] R. Balan, *Extensions of No-Go Theorems to Many Signal Systems*, Contemporary Mathematics 216, AMS Providence R.I. (1998), 3-14
- [8] R. Balan, *Equivalence Relations and Distances between Hilbert Frames*, Proceedings of the AMS, vol.127 no.8, (1999) 2353-2366
- [9] R. Balan, *Density and Redundancy of the Noncoherent Weyl-Heisenberg Superframes*, Contemporary Mathematics , AMS Providence R.I. (1999),
- [10](*) R. Balan, G. Taubin, *3D Mesh Geometry Filtering Algorithms for Progressive Transmission Schemes*, Computer-Aided Design, vol.32, no.13, (2000) 825-846 in the Special Issue of Journal of CAD on Multiresolution Geometric Models (2000)
- [11](*) R. Balan, I. Daubechies, V. Vaishampayan, *The Analysis and Design of Windowed Fourier Frame based Multiple Description Source Coding Schemes*, in IEEE Trans.on IT, vol.46, no.7, (2000) 2491-2537
- [12] R. Balan, P. Casazza, C. Heil, Z. Landau, *Deficits and Excesses of Frames*, Advances in Computational Mathematics, vol. 18, (2003) 93-116
- [13] R. Balan, P.G. Casazza, C. Heil, Z. Landau, *Excesses of Gabor Frames*, Appl. Comput. Harmon. Anal. , vol. 14, (2003) 87-106
- [14](*) R. Balan, J. Rosca, S. Rickard, *Equivalence Principle for Optimization of Sparse versus Low-Spread Representations for Signal Estimation in Noise*, International Journal of Imaging Systems and Technology, vol.15, no.1, (2005) 10-17
- [15](*) S. Rickard, R. Balan, H.V. Poor, S. Verdu, *Canonical time-frequency, time-scale, and frequency-scale representations of time-varying channels*, J. Comm. Infor. Syst., Vol. 5, No. 5, (2005) 1-30
- [16] R. Balan, P.G. Casazza, D. Edidin, *On Signal Reconstruction without Noisy Phase*, Appl. Comput. Harmon. Anal., 20 (2006) 345-356
- [17] R.Balan, P.G.Casazza, C.Heil, Z.Landau, *Density, Overcompleteness, and Localization of Frames. I Theory*, J.Fourier Anal. Applic., Vol.12, No.2, (2006) 105-143
- [18] R.Balan, P.G.Casazza, C.Heil, Z.Landau, *Density, Overcompleteness, and Localization of Frames. II Gabor Frames*, J.Fourier Anal. Applic., Vol.12, No. 3, (2006) 309-344
- [19] R.Balan, P.G.Casazza, D.Edidin, G.Kutyniok, *A New Identity for Parseval Frames*, Proc. Amer. Math. Soc., 135 (2007), 1007-1015
- [20] R.Balan, P.G.Casazza, D.Edidin, *Equivalence of Reconstruction from the Absolute Value of the Frame Coefficients to a Sparse Representation Problem*, IEEE Sig.Proc.Letters. vol.14, no.5 (2007), 341-343
- [21] R.Balan, Z.Landau, *Measure functions for frames*, Journal of Functional Analysis, 252 (2007), 630-676
- [22] R.Balan, *A Noncommutative Wiener Lemma and A Faithful Tracial State on Banach Algebra of Time-Frequency Operators*, Trans.Amer.Math.Soc., 360 (2008), 3921-3941
- [23] R.Balan, *An Extension of Barbashin-Krasovskii-LaSalle Theorem to a Class of Nonautonomous Systems*, Nonlinear Dynamics and Systems Theory, 8(3) (2008) 255-268

- [24](*) F.Meshkati, H.V.Poor, S.C.Schwartz, R.Balan, *Energy-Efficient Resource Allocation in Wireless Networks with Quality-of-Service Constraints*, IEEE Trans. on Communications vol. 57, no. 11 (2009)
- [25] R. Balan, B.G.Bodmann, P.G.Casazza, D.Edidin, *Painless Reconstruction from Magnitudes of Frame Coefficients*, J.Fourier Anal. Applic. vol. 15, no. 4 (2009) 488-501
- [26] R. Balan, I. Krishtal, *An Almost Periodic Noncommutative Wiener's Lemma*, Journal of Mathematical Analysis and Applications, vol. 370, no. 2 (2010) 339-349
- [27] R. Balan, P. Casazza, Z. Landau, *Redundancy of Localized Frames*, Israeli Journal of Mathematics vol. 185 (2011), 445-476
- [28] R. Balan, J.G. Christensen, I.A. Krishtal, K.A. Okoudjou, J.L. Romero, *Multi-Window Gabor Frames in Amalgam Spaces*, Math. Res. Lett., vol. 21, no.1 (2014) 55-69
- [29] R. Balan, Y. Wang, *Invertibility and Robustness of Phaseless Reconstruction*, Appl. Comp. Harm. Anal. vol. 38, no. 3, (2015) 469-488.
- [30] R. Balan, *Reconstruction of Signals from Magnitudes of Redundant Representation: The Complex Case*, available online arXiv:1304.1839v1 [math.FA] , Apr. 2013, Foundations of Computational Mathematics, vol. 16(3), (2016) 677-721. (doi: 10.1007/s10208-015-9261-0).
- [31] R. Balan, *Stability of Frames which Give Phase Retrieval*, to appear in the Houston Journal of Mathematics 2017.
- [32] R. Balan, D. Zou, *On Lipschitz inversion of nonlinear redundant representations*, Contemporary Mathematics 650, "Trends in Harmonic Analysis and Its Applications", 15-22, 2015.
- [33] R. Balan, *Frames and Phaseless Reconstruction*, online 1601.0345v1 [math.FA], AMS Short Course at the Joint Mathematics Meetings, San Antonio, January 2015. to appear in Proceedings of Symposia in Applied Mathematics, AMS 2016.
- [34] R. Balan, D. Zou, *On Lipschitz Analysis and Lipschitz Synthesis for the Phase Retrieval Problem*, available online arXiv:1506.02092 [math.FA], Linear Algebra and Applications 496, 152-181 (2016).
- [36] R. Balan, M. Singh, D. Zou, *Lipschitz Properties for Deep Convolutional Networks*, available online arXiv:1701.05217 [cs.LG], to appear Contemporary Mathematics 2018.
- [37] R. Balan, K. Okoudjou, A. Poria, *On a Feichtinger Problem*, to appear in Operators and Matrices (2018).

c. Refereed conference proceedings

(*) indicates journals where the authors' order is by importance of contribution; in all other papers the authors are listed alphabetically as in customary in mathematics.

- [1](*) R. Balan, A. Jourjine, J. Rosca, *AR processes and sources can be reconstructed from degenerate mixtures*, ICA and BSS Conference, Aussois France, January 11-15 1999, 467-472
- [2](*) R. Balan, J. Rosca, S. Rickard, J. ORuanaidh, *The Influence of Windowing on Time Delay Estimates*, CISS 2000, Princeton NJ, March 15-17 2000
- [3] R. Balan, *Multiplexing of Signals using Superframes*, Wavelets Applications in Signal and Image Processing VIII, vol.4119 , (2000) 118-129
- [4] R. Balan, *Topological Obstructions to Localization Results*, Wavelets Applications in Signal and Image Processing VIII, vol. 4478, (2001) 184-192
- [5](*) R. Balan, J. Rosca, *Statistical Properties of STFT Ratios for Two Channel Systems and Applications to Blind Source Separation*, ICA and BSS Conference 2000, Helsinki, FINLAND, June 2000
- [6](*) J. Rosca, S. Sudarsky, R. Balan, D. Comaniciu, *Mobile Interaction with Remote Worlds: The Acoustic Periscope*, IJCAI 2001.
- [7](*) S. Rickard, R. Balan, J. Rosca, *Real-Time Time-Frequency Based Blind Source Separation*, ICA and BSS Conference, San Diego, CA, December 2001
- [8](*) J. Rosca, N. Fan, R. Balan, *Real-Time Audio Source Separation by Delay and Attenuation Compensation in the Time Domain*, ICA and BSS Conference, San Diego, CA, December 2001
- [9](*) R. Balan, J. Rosca, S. Rickard, *Robustness of Parametric Source Demixing in Echoic Environments*, ICA and BSS Conference, San Diego, CA, December 2001
- [10](*) S. Aalburg, C. Beaugeant, S. Stan, T. Fingscheidt, R. Balan, J. Rosca, *Single- and Two-Channel Noise Reduction For Robust Speech Recognition in Car*, ISCA Workshop, GERMANY, June 2002

- [11](*) R. Balan, J. Rosca, *Microphone Array Speech Enhancement by Bayesian Estimation of Spectral Amplitude and Phase*, IEEE Sensor Array and Multichannel Signal Processing Workshop, Rosslyn VA, Aug. 2002
- [12](*) J. Rosca, R. Balan, N. Fan, C. Beaugeant, V. Gilg, *Multichannel Voice Detection in Adverse Environments*, EUSIPCO 2002, Toulouse FRANCE, September 2002
- [13](*) R. Balan, J. Rosca, S. Rickard, *A Stochastic Speech Model Supporting W-Disjoint Orthogonality*, CISS 2003, Baltimore MD, March 2003
- [14](*) S. Rickard, R. Balan, J. Rosca, *Blind Source Separation based on Space-Time-Frequency Diversity*, ICA and BSS Conference 2003, Nara Japan, April 2003
- [15](*) R. Balan, J. Rosca, S. Rickard, *Non-square BSS under Coherent Noise by Beamforming and Time-Frequency Masking*, ICA 2003, Nara Japan, April 2003
- [16](*) J. Rosca, R. Balan, S. Rickard, *Scalable Audio Source Separation in the Presence of Noise*, DAGA 2003, Aachen Germany, June 2003.
- [17](*) R. Balan, J. Rosca, S. Rickard, *Scalable Non-Square BSS in the Presence of Noise*, ICASSP 2003, Hong Kong China, April 2003
- [18](*) J. Rosca, R. Balan, C. Beaugeant, *Multi-Channel Psychoacoustically Motivated Speech Enhancement*, ICASSP 2003, Hong Kong China, April 2003
- [19] R. Balan, Z. Landau, *Measure and Redundancy of Frames*, Proceedings of SPIE 2003, San Diego, CA.
- [20](*) S. Rickard, C. Fearon, R. Balan, J. Rosca, *MINUET: Musical Interference Unmixing estimation Technique*, in Proceedings of CISS 2004, Princeton NJ, March 2004
- [21](*) J. Rosca, C. Borss, R. Balan, *Generalized Sparse Signal Mixing Model and Application to Noisy Blind Source Separation*, ICASSP 2004, Montreal, Canada, May 2004
- [22](*) R. Balan, J. Rosca, C. Beaugeant, V. Gilg, T. Fingscheidt, *Generalized Stochastic Principle for Microphone Array Speech Enhancement and Applications to Car Environments*, EUSIPCO 2004, Vienna, Austria, September 2004.
- [23](*) L. Hong, J. Rosca, R. Balan, *Bayesian Single Channel Speech Enhancement Exploiting Sparseness in the ICA Domain*, EUSIPCO 2004, Vienna, Austria, September 2004.
- [24](*) R. Balan, H.V. Poor, S. Rickard, S. Verdu, *Time-Frequency and Time-Scale Canonical Representations of Doubly Spread Channels*, EUSIPCO 2004, Vienna, Austria, September 2004.
- [25](*) N. Fan, R. Balan, J. Rosca, *Comparison of Wavelet and FFT based Single Channel Speech Signal Noise Reduction Techniques*, SPIE Industrial Applications of Wavelets Conference 2004, Philadelphia, PA, October 2004.
- [26](*) B. Grundlehner, J. Lecocq, R. Balan, J. Rosca, *Performance Assessment Method for Speech Enhancement Systems*, SPS-DARTS 2005, Antwerp, Belgium, April 2005.
- [27] R. Balan, P. Casazza, D. Edidin, *On signal reconstruction from absolute value of frame coefficients*, SPIE Wavelets Applications in Signal and Image Processing XI, vol. 5914, (2005)
- [28] R. Balan, P. Casazza, C. Heil, Z. Landau, *Excess of Parseval frames*, SPIE Wavelets Applications in Signal and Image Processing XI, vol. 5914, (2005)
- [29] P. Casazza, R. Balan, D. Edidin, G. Kutyniok, *Decomposition of frames and a new frame identity*, SPIE Wavelets Applications in Signal and Image Processing XI, vol. 5914, (2005)
- [30](*) N. Fan, J. Rosca, R. Balan, *Speaker Identification with Combined Threshold Identification Front-End & UBM*, 4th IEEE Workshop on Automatic Identification Advanced Technology (AutoID 2005), Buffalo NY 2005.
- [31] (*) P. Bogdan, R. Balan, J. Rosca, *Statistical Signal Processing for Novelty Detection*, CSCS 2005, Bucharest, Romania, May 2005
- [32](*) R. Balan, J. Rosca, *Convolutional Demixing with Sparse Discrete Prior Models for Markov Sources*, Proc. ICA 2006, Charleston SC USA, March 2006.
- [33](*) R. Balan, J. Rosca, *Source Separation using Sparse Discrete Prior Models*, ICASSP 2006, Toulouse, France, May 2006.
- [34](*) F. Meshkati, H.V. Poor, S.C. Schwartz, R. Balan, *Energy-Efficient Power and Rate Control with QoS Constraints: A Game-Theoretic Approach*, Int. Wireless Comm. Mobile Comp. (IWCMC) Conf. 2006 - Cross-Layer Design and Protocols, Vancouver, Canada, July 2006.

- [35](*) R.Balan, J.Rosca, *MAP Source Separation using Belief Propagation Networks*, 40th Asilomar Conference, CA, October 2006.
- [36](*) N.Fan, J.Rosca, R.Balan, *Speech Noise Estimation using Enhanced Minima Controlled Recursive Averaging*, ICASSP 2007, Hawaii, USA, April 2007.
- [37]. R.Balan, B.G.Bodmann, P.G.Casazza, D.Edidin, *Painless Reconstruction from Magnitudes of Frame Coefficients*, Proceedings SPIE Wavelets Applications in Signal and Image Processing XII, San Diego Aug. 2007.
- [38]. R.Balan, B.G.Bodmann, P.G.Casazza, D.Edidin, *Fast Algorithms for Signal Reconstruction without Phase*, Proceedings SPIE Wavelets Applications in Signal and Image Processing XII, San Diego Aug. 2007.
- [39] R.Balan, *Estimator for Number of Sources using Minimum Description Length Criterion for Blind Sparse Source Mixtures*, ICA 2007, London, UK, Sept. 2007.
- [40]. B.G.Bodmann, P.Casazza, R.Balan, *Frames for Linear Reconstruction without Phase*, CISS 2008, Princeton, NJ, March 2008.
- [41]. R.Balan, *Information Theory based Estimator of the Number of Sources in a Sparse Linear Mixing Model*, CISS 2008, Princeton, NJ, March 2008.
- [42] R.Balan, *A Nonlinear Reconstruction Algorithm from Absolute Value of Frame Coefficients for Low Redundancy Frames*, SampTA Conference, Marseille, France, May 2009.
- [43] R.Balan, *On Signal Reconstruction from Its Spectrogram*, CISS 2010, Princeton, NJ, March 2010.
- [44] (*) M.Scharrenbroich, M.Zatman, R.Balan, *Cooperative Networked Radar: The Two-Step Detector*, Proceedings of Asilomar Conference on Signals, Systems and Computers, Monterey CA, November 9 2011.
- [45] (*) M.Scharrenbroich, M.Zatman, R.Balan, *Performance of a Practical Two-Step Detector for Non-fluctuating Targets*, Proceedings SAM 2012, Stevens Institute of Technology, NJ.
- [46] R.Balan, *Stability of Phase Retrievable Frames*, SPIE Wavelets Applications in Signal and Image Processing XII, San Diego Aug. 2013.
- [47] (*) Yenming M. Lai, R. Balan, H. Claussen, J. Rosca, *Broadband Sensor Location Selection using Convex Optimization In Very Large Scale Arrays*, WASPAA 2013 Workshop, New Paltz, NY, Oct. 2013.
- [48] (*) Yenming M. Lai, R. Balan, H. Claussen, J. Rosca, *Optimal Beampattern Design For Very Large Sensor Arrays With Sparse Sampling*, 47th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2013.
- [49] R. Balan, *The Fisher Information Matrix and the CRLB in a Non-AWGN Model for the Phase Retrieval Problem*, SampTA 2015, Washington DC, May 2015

d. Original Designs, Plans, Inventions, and Patents

1. "Separation of AR Sources from their Single Channel Measurement", US Patent # 6,343,268, January 29, 2002
- 2,3. "Optimal ratio estimator for multisensor systems", US Patent # 6,577,966, June 10, 2003, and US Patent # 6,868,365, Mar 15, 2005
4. Method of denoising signal mixtures, US Patent # 6,901,363, May 31, 2005
5. Online Blind Source Separation, US Patent # 6,954,494, October 11, 2005
- 6,7. Method and Apparatus for Noise Filtering, US Patent # 6,952,482, October 4, 2005, and US Patent # 7,110,944, September 19, 2006
8. Apparatus and Method for Estimating the Direction of Arrival of a Source Signal using a Microphone Array, US Patent # 7,084,801, August 1, 2006
9. Real-Time Audio Source Separation by Delay and Attenuation Compensation in the Time Domain, US Patent # 7,088,831, August 8, 2006
10. Multichannel voice detection in adverse environments, US Patent # 7,146,315, December 5, 2006
11. System and method for remotely experiencing a virtual environment, US Patent # 7,149,691, December 12, 2006
12. Multi-channel speech enhancement system and method based on psychoacoustic masking effects, US Patent # 7,158,933, January 2, 2007
13. System and Method for Adaptive Multi-Sensor Arrays, US Patent # 7,218,741, May 15, 2007
14. Method for Eliminating an Unwanted Signal from a Mixture Via Time-Frequency Masking, US Patent # 7,302,066, November 27, 2007

15. System and method for nonlinear signal enhancement that bypasses a noisy phase of a signal, US Patent# 7,392,181, June 24, 2008
16. System and method for non-square blind source separation under coherent noise by beamforming and time-frequency masking, US Patent# 7,474,756, January 6, 2009
17. "Method and Apparatus to Inspect Wireless Traffic and Mitigate Packet Elimination for Wireless Saturation Avoidance", World Patent WO 2010/002729 A1, January 7, 2010
18. "Method and apparatus for estimating collision probability in a wireless network", US Patent# 7,839,793, November 23, 2010
19. "Method and apparatus to inspect wireless traffic and mitigate packet elimination for wireless saturation avoidance", US Patent# 8,045,471, October 25, 2011
20. "Method for congestion detection in packet transmission networks", US Patent# 8,737,213, May 27, 2014
21. "Method and Apparatus for Acoustic Area Monitoring by Exploiting Ultra Large Scale Arrays of Microphones", US Patent# 9,264,799, February 16, 2016.
22. "Broadband Sensor Location Selection Using Convex Optimizatoin in Very Large Scale Arrays", US Patent # 9,615,172, April 4, 2017.
23. "Simultaneous Solution for Sparsity and Filter Responses for a Microphone Network", US Patent Application # 20170064478 (2017).

e. Book Reviews, Other Articles, and Notes

- [1] R. Balan, Y. Eldar, T. Strohmer, *Editorial - Special Issue on Frames and Overcomplete Representations in Signal Processing, Communications, and Information Theory*, EURASIP Journal on Applied Signal Processing, vol. 2006, Article ID 91786, 2 pages, 2006. doi:10.1155/ASP/2006/91786
- [2] R. Balan, *Reconstruction of Signals from Magnitudes of Redundant Representations*, arXiv posting <http://arxiv.org/abs/1207.1134> [math.FA] , July 2012.

Editorial Work

Editorial Advisory Board Member of Journal of Applied and Computational Harmonic Analysis (since June 2005)

Associate Editor of IEEE Transactions on Information theory, 2017-2019.

Guest Editor of special issue of the EURASIPs Journal on Applied Signal Processing on Frame theory in signal processing, communications, and information theory, Q4 of 2005

Summer Schools

Main Organizer of: *Graduate Summer School on Harmonic Analysis and Applications* at UMD, July-August 2015; 65 students; 7 lecturers; sponsored by IMA and NSF (\$120K budget)

Conference/Session Organizer

Session on "Phase Retrieval and Low-Rank Matrix Completion" at the Sampling Theory and Applications (SampTA) 2017 International Conference, Talinn, Estonia, July 2017.

Co-chair SampTA19 Technical Committee, Bordeaux 2019.

Graduate Summer School Organizer, "Modern Harmonic Analysis and Applications", July-August 2015, UMD.

Mini-Course at AMS Joint Mathematical Meeting, January 2015, San Antonio, TX

Conference Organizer, "From Banach Spaces to Frame Theory and Applications", UMD 2010.

Conference Organizer for FFT 2007 - present UMD

Program committee member and Special Session Organizer for SPIE 2009 Joint Meeting Wavelet Conference, August 2009; SPIE 2009; SPIE 2011; SPIE 2013; SPIE 2015; SPIE 2017

Workshop Organizer at IMA: "Mathematical Modeling in Industry", August 8-17, 2007, Minneapolis, MN

General Conference Chair: IEEE Sarnoff 2007

Program committee member and Special Session Organizer for SPIE 2007 Joint Meeting Wavelet Conference, August 2005; SPIE 2007

Program committee member and Tutorials Chair for the IEEE Sarnoff 2006 Symposium, April 2005; *Technical Program co-Chair*, IEEE Sarnoff 2006

Siemens-Princeton MRI Data Processing Workshop co-organizer, June 2005

Siemens-Princeton Wireless Communications Workshop co-organizer, February 2005

Program Committee member: since its inception SPIEs Wavelet Applications in Industrial Processing Conference (2003, 2004, 2005,2006); ICA 2006; Globecom 2006

Conference co-Chair: IEEE Global SIP 2015, Symposium on "Signal Processing and Mathematical Modeling of Biological Processes with Applications to Cyber-Physical Systems for Precise Medicine"

REU Team Mentor: MAPS-REU Summer 2015 at UMD, "Applied Harmonic Analysis"

1. Other

List of Recent Presentations (including Conference talks):

<http://www.math.umd.edu/~rvbalan/PRESENTATIONS/presentations.html>

Selected Colloquium/Seminars

July 1999: College Station, TX

January 2000: Drexel University, Department of Mathematics, Philadelphia, PA

October 2000: Georgia Institute of Technology, Department of Mathematics, Atlanta, GA

October 2001: University of Maryland, College Park, MA

November 2001: University of Minnesota, Institute of Mathematics and Its Applications, Minneapolis, MN

July 2002: College Station, TX

September 2002: University of Missouri, Department of Mathematics, Colombia, MO

May 2004: Courant Institute of Mathematics, NYU, New York City, NY

March 2005: Princeton University, EE, Princeton, NJ

September 2005: Courant Institute of Mathematics, NYU, New York City, NY

October 2005: Princeton University, Brown Bag Seminar, Princeton, NJ

February 2006: University of Texas at Dallas, Dallas, TX

February 2007: University of Toronto, Toronto, CA

March 2008: UMBC, Department of Mathematics, Baltimore, MD

March 2008: US Naval Academy, Department of Mathematics, Annapolis, MD

April 2008: ECE, UMD, MD

October 2008: University of Pennsylvania, Department of Mathematics, Philadelphia, PA

April 2010: Vanderbilt University, Nashville, TN

May 2011: SIAM Expository Lecture, College Park, MD

January 2012: Department of Computer Science, Drexel University, Philadelphia PA

June 2012: Oberwolfach Workshop, Germany

October 2102: ESI Workshop, Vienna, Austria

February 2013: Phaseless Reconstruction Workshop, College Park, MD

August 2013: CIMPA Summer School, Mar del Plata, Argentina

December 2013: Colloquium Talk, PACM, Princeton University, NJ

January 2014: Department of Computer Science-Mathematics joint talk, Drexel University, Philadelphia, PA

February 2014: Seminar Talk, Department of Mathematics, University of Houston, TX

June 2014: IEEE SPS Chapter Invited Talk, Arlington, VA

September 2014: CIRM, Marseille, France

October 2014: Colloquium Talk, Department of Mathematics and Statistics, American University, Washington DC

January 2016: Applied Mathematics Seminar Talk, Stanford University, Palo Alto, CA

March 2016: Workshop at Hausdorff Institute of Mathematics, Bonn, Germany

March 2016: Colloquium Talk, University of Central Florida, Orlando, FL

April 2016: Colloquium Talk, Drexel University, Philadelphia, PA

September 2016: Seminar Talk, Johns Hopkins University, Baltimore, MD

March 2017: Seminar Talk, University of Houston, TX

March 2017: Colloquium Talk, Vanderbilt University, TX

October 2017: IEEE Talk, College Park, MD

March 2018: Oberwolfach Workshop, Germany

April 2018: Colloquium Talk, Georgetown University, DC

May 2018: NIST Talk, Gaithersburg, MD

d. Teaching Awards and Other Special Recognition

Research, mentoring and patent development recognition featured in article "UMD Researchers Build a Smaller Device to Pick up Bigger Noises", September 24, 2015, available at <http://go.umd.edu/4bu>

f. Advising: Research Direction

i. Undergraduate

David Bekkerman, UMD - graduated May 2015; admitted by AMSC Program at UMD
Zeyad Emam, UMD - graduated May 2016 ; admitted by AMSC Program at UMD
Chin-Ming Chang, UMD - to graduate May 2018

ii. Master's

George Quinn (AMSC) - Dec. 2016

iii. Doctoral

Nathaniel Strawn (MATH, joint with John Benedetto) - graduated 2011 (postdoc at Duke U., prof. at Georgetown U.)
Bryant Angelos (MATH, joint with Dillip Madan) - graduated 2013 (industry)
Yenming Mark Lai (AMSC) - graduated Aug. 2014 (postdoc at U.Texas Austin)
Dongmian Zou (AMSC) - graduated May 2017 (postdoc at IMA, UMN)
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